IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFOIRE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant: Bill Tobler Group Art Unit: 3683

Serial No.: 10/780,301 Examiner: Melody M. Burch

Filed: February 17, 2004 Date Mailed:

For: SYSTEM FOR CONTROLLING BRAKE PULSING AT VEHICLE NATURAL VIBRATION FREQUENCIES

Attorney Docket No.: 81091394

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THIRD AMENDED APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Sir:

Appellant appeals in the captioned application from the Examiner's final rejection, dated October 12, 2006, of Claims 1-7 and 15-24. Claim 2 was objected to for containing informalities. Claims 23 and 24 were rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Claims 1-4, 15,

and 17 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6122584 to Lin et al. It is urged that the rejection be reversed and that all the claims be allowed.

(1) REAL PARTY IN INTEREST

The real party in interest in the present appeal is Ford Global Technologies, LLC

(2) RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that are known to the Appellants, the Appellants' legal representatives or the assignee.

(3) STATUS OF CLAIMS

Claims 1-24 are pending in the application.

Claims 8-14 stand allowed.

Claims 1-4, 15, 17, 23, and 24 stand rejected.

Claims 5-7, 16 and 18-22 stand objected to.

Claims 1-7 and 15-24 are being appealed.

(4) STATUS OF AMENDMENTS

A final office action was issued On October 12, 2006 allowing claims 8-14, rejecting claims 1-4, 15, 17, 23 and 24, and objecting to claims 5-7, 16 and 18-22..

A request for reconsideration was filed on or about December 5, 2006, which contained amendments to Claims 1 and 16 and withdrew Claim 24.

An advisory action dated December 29, 2006 was received from the Examiner refusing entry of the proposed amendments, denying the withdrawal of claim 24, allowing claims 8-14, maintaining rejection of claims 1-4, 15, 17, 23 and 24, and maintaining objections to claims 5-7, 16 and 18-22.

A Notice of Appeal was filed on or about January 12, 2007.

An appeal brief was filed on or about March 12, 2007.

A notice of Non-Compliant Appeal Brief was issued May 8, 2007.

A first revised Appeal Brief was filed on or about June 8, 2007.

A notice of Non-Compliant Appeal Brief was issued on or about September 24, 2007.

A second revised Appeal Brief was filed on or about October 24, 2007.

A notice of Non-compliant Appeal Brief was issued on or about November 8, 2007.

(5) SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1. In a vehicle having a powertrain and an antilock braking system (ABS) (Specification paragraph 8, No. 74 in Figure 1), a method of controlling the ABS, comprising: accumulating responses of the ABS to a series of sudden braking events; (Specification paragraph 29, No. 98 in Figure 2) correlating the ABS responses to one or more natural vibration frequencies of the vehicle; (specification paragraph 29, No 100 in Figure 2) and, selecting an ABS response to a brake request based on the correlated ABS responses in order to avoid exciting the powertrain at the one or more natural vibration frequencies. (specification paragraph 30, No.104 in Figure 2)

Claim 8. A method of controlling an antilock braking system (ABS) to avoid exciting a natural vibration frequency of a vehicle (Specification paragraph 9), comprising: determining the response of the ABS to a series

of sudden braking events; (Specification paragraph 27, No. 94 in Figure 2) developing a set of vehicle natural vibration frequencies that may be excited by the ABS using the response of the ABS to the series of braking events; (specification paragraph 28, No. 96 in Figure 2) selecting an ABS response to a driving event requiring activation of the ABS; (specification paragraph 30, No. 102 in Figure 2) determining whether the selected ABS response may excite any of the frequencies in the developed set (specification paragraph 30, No. 104 in Figure 2); and altering the selected ABS response to avoid exciting any of the frequencies in the developed set(specification paragraph 30, No. 112 in Figure 2).

Claim 15. A system for controlling an anti-lock braking system (ABS) to avoid exciting a natural vibration frequency of a vehicle (Specification paragraph 9), comprising: computer memory having a stored set of ABS responses to past sudden braking events requiring actuation of the vehicle's ABS(Specification paragraph 28); and, a set of programmed instructions for comparing a proposed ABS response with the ABS responses stored in the memory (specification paragraph 31, No. 88 in Figure 3) and for altering the proposed response based on the comparison to

avoid an ABS responsive that may excite a vehicle natural vibration frequency. (specification paragraph 30, No. 112 in Figure 2).

Claim 18. A method of controlling an anti-lock braking system (ABS) to avoid exciting a natural vibration frequency of a vehicle (Specification paragraph 9), comprising: storing responses of the ABS to a series of past sudden braking events (Specification paragraph 29, No. 98 in Figure 2) that resulted in exciting a vehicle natural vibration frequency (specification paragraph 30, No. 96 in Figure 2), selecting a proposed ABS response to a driving event requiring actuation of the ABS (specification paragraph 30, No. 102 in Figure 2); and, altering the proposed ABS response based on the stored ABS responses (specification paragraph 30, No. 104 in Figure 2).

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Ground 1

Claim 2 is objected to because the phrase "natural frequencies" first recited in line 4 of claim 2 should be changed to --natural vibration frequencies-- to be consistent with claim 1.

Ground 2

Claims 23 and 24 are rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement.

Ground 3

Claims 1-4, 15, and 17 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6122584 to Lin et al.

Ground 4

Claims 5-7, 16 and 18-22 are objected to as being dependant upon a rejected base claim.

(7) ARGUMENTS

Claim 2

Claim 2 is objected to because of the following informalities: the phrase "natural frequencies" first recited in line 4 of claim 2 should be changed to -natural vibration frequencies- to be consistent with the language

in claim 1. This change should be made throughout the claim listing. *10-12-06 OA, Pg.2, S1*

The objection to Claim 2 because of informalities is improper and must be reversed.

Claims 2, 4, 8, 9, 10, 15, 17, 18, and 24 were amended in the 12/05/2006 request for reconsideration to include the phrase "natural vibration frequencies", replacing the use of the phrase "natural frequencies" in those claims. The amendment did not introduce new matter because as the Examiner stated the phrase "natural vibration frequencies" was previously included in claim one and was included in the specification (specification paragraphs 1,5)

The amendments made to the claims to correct the informalities render Examiner's objections to the claims moot. Accordingly, the objections to the claims because of informalities should be reversed.

Claims 23 and 24

Claim Rejections under 35 U.S.C. 112

The Examiner rejected Claims 23 and 24 under 35 U.S.C. 112, first paragraph.

In rejecting Claims 23 and 24 under 35 U.S.C. 112, Examiner stated,

> Claims 23 and 24 are rejected under 35 U.S.C. 112, first paragraph for failing to comply with the written description requirement...The originally filed specification fails to provide support for the limitation of measuring braking pulsing frequencies. Paragraph [0029] of the published application suggests that the frequencies are *inferred* and not actually measured. Clarification is required. Claim 24 is rejected due to its dependency from claim 23.

Claim 23 has been canceled, and its limitations incorporated into independent Claim 18.

More particularly, In the 12-29-06 request for reconsideration an amendment to Claim 18 was proposed but not entered. The amendment included the limitation of, "**monitoring the response of the ABS to a series of braking events, wherein the monitoring step includes accumulating and recording brake pressures and brake pulsing frequencies;**"

Support for the foregoing amendment to Claim 18 is found in ¶[0029] of Applicant's application, which states, "**...the responses of the ABS system to a series of sudden braking events is accumulated and recorded...Brake pressure and wheels speed during sudden braking events are specifically monitored as part of the process of accumulating ABS responses.**" (specification paragraph 29, No. 98)

The dependency of Claim 24 has been changed from Claim 23 to independent Claim 18, as reflected in the Claim 24 found in the attached listing of Claims.

Thus, the rejection of Claims 23 and 24 under 35 USC 112, first paragraph has been obviated. Accordingly, the rejection of claims 23 and 24 under 35 U.S.C. 112 should be reversed.

Claims 1-4, 15 and 17

Claims 1-4 (specification paragraph Fig. 2.) 15, and 17 are rejected under 35 USC § 102(b) as being anticipated by US Patent 6122584 to LIN et al.

The rejection of claims 1-4, 15, and 17 under 35 USC §102(b) is improper and must be reversed.

LIN is directed to a system of ABS application wherein the operation of the ABS of a vehicle is monitored and applied by a control system. The control system applies the ABS in order to help maintain the stability of the vehicle.

The ABS is applied to correct for undesirable yaw and lateral motion rates of the vehicle, when compared to the linear motion rate of the vehicle. The ABS is applied using data stored and indexed in a memory. The data is stored and indexed exclusively as a function of the vehicle's speed.

Claim 1 of the present invention discloses a method of controlling the ABS of a vehicle having a powertrain. In the 12/05/2006 request for reconsideration office action a proposed amendment to the Claim 1 included the limitations of Claims 5 and 6, but the amendment was not entered.

The Examiner based the rejection on the contention that "Lin et al. disclose in col. 20 lines 54-60 a method of controlling the ABS..." (Paragraph 5, 10/12/2006 Office Action).

> 4. The brake control method of claim 1, wherein the step of specifying the un-damped natural frequency comprises storing specified values of the un-damped natural frequency in a look-up table as a function of vehicle speed, and retrieving the stored values from said look-up table during operation of said vehicle as a function of the measured speed.
> LIN, Col. 20, Lines 54-60

The above-cited portion of LIN, cited by Examiner, relates only to the storage or recordation of natural frequency data. This facet of LIN does not specify that the natural frequency data recorded and retained is directly related to either the ABS system of a vehicle, nor does it specify a direct relationship with the behavioral characteristics of the vehicle or its braking system in relation to the stored data.

Additionally, LIN teaches that each datum is to be stored and indexed specifically as a function of a

particular vehicle speed. *See LIN, Col. 20, Lines 56-57* Retrieval and utilization of the data by the vehicle's control system is also a function of the vehicle speed. *See LIN, Col. 20, Lines 58-59* LIN does not teach, disclose, or suggest the use of any indexing or retrieval criteria for the data, other than that which operates as a function of the speed of the vehicle.

Applicant's application does not contain the limitation relating data storage and retrieval to functions of the vehicle speed. Instead, Applicant's application discloses a system that correlates the response of the ABS to the natural frequencies of the vehicle's powertrain. (specification paragraph 29, No. 100 Figure 2.) Advantageously, this allows the method of the Applicant's invention to access past ABS braking events independently of the vehicle's speed, (specification paragraph 29, No. 98 Figure 2.), "various combinations of brake pressures and pulsing frequencies to avoid brake lock up and maximize braking effectiveness."(specification paragraph 29)

Applicant respectfully submits that the foregoing arguments and the amendments to the Claims places Claim 1 of Applicant's Application in a condition for allowance. Accordingly, Applicant also respectfully submits that Claims 2-4, which depend from Claim 1, are now also in condition for allowance, which allowance is earnestly solicited.

Claim 15 was amended to include the limitations of Claim 16, as well as the additional alternative responses of delaying the proposed ABS response, and altering the

rate at which the brakes are pulsed, as stated in Claim 15, "...**wherein the programmed instructions include instructions for accelerating the proposed ABS response, delaying the nominal ABS response for a selected period of time, or altering the rate at which the brakes are pulsed**.." (specification paragraph 9).

In regards to Claim 15 of Applicant's application, Applicant respectfully submits that LIN does not anticipate Claim 15.

LIN teaches, "...**storing specified values of the un-damped natural frequency in a look-up table as a function of vehicle speed, and retrieving the stored values from said look-up table during operation of said vehicle as a function of the measured speed.**" ***LIN, col. 20, Lines 56-60***

LIN does not teach, suggest, or disclose storing the prior actuations of the ABS, nor the accompanying behaviors of the ABS in relation to the natural vibration frequencies of the vehicle, indexed independently of vehicle speed.

Claim 15 of Applicant's application discloses a "...**computer memory having a stored set of ABS responses to past sudden braking events requiring actuation of the vehicle's ABS**..." *Applicant's Application, Claim 15*

Claim 15 of Applicant's application is directed to the storage of past sudden braking events that have required the actuation of the ABS. (specification paragraph 29, No. 98 Figure 2.) This storage system of Applicant's

application is not a function of vehicle speed, nor is the indexing or retrieval a function of vehicle speed.

Applicant respectfully submits that the foregoing arguments and the amendments to the Claims places Claim 15 of Applicant's Application in a condition for allowance. Accordingly, Applicant also respectfully submits that Claim 17, which depends from Claim 15, is also in condition for allowance, which allowance is earnestly solicited.

The Applicant therefore respectfully submits that LIN does not disclose, teach, or suggest the method of the present invention.

The Applicant has clearly shown that the basic steps, as recited in independent claims 1, 8, 15, and 18 of the present invention are patentably distinct from the LIN reference.

Clearly, the apparatus and methods disclosed in the LIN reference does not anticipate the claimed invention. Thus, the LIN reference fails to disclose, teach, or suggest the method of the present invention.

Claims 5-7, 16, and 18-22

Claims 5-7, 16 and 18-22 are objected to as being dependant upon a rejected base claim.

The objections to claims 5-7, 16 and 18-22 are improper and must be reversed.

The Examiner stated that "claims 5-7, 16 and 18-22 would be allowable if rewritten in independent form including al of the limitations of the base claim and any intervening claims." (10/12/2006 OA paragraph 7)

Accordingly, in the 12/05/2006 request for reconsideration the limitations of claims 5 and 6 were incorporated into claim 1 as stated supra and claims 5 and 6 were cancelled. (See request for reconsideration page 14)

Additionally in the request for reconsideration Claims 16 and 22 were cancelled. See request for reconsideration pages 7, 9, & 10)

It is unclear as to what Examiner meant, as Claim 18 is an independent claim. Being an independent claim eliminates the possibility of being dependent upon a rejected base claim.

However, Claim 18 was amended to incorporate the limitations of Claim 23, as discussed supra. See Claim Rejections under 35 U.S.C. 112, pg. 10. Accordingly, Claim 23 has been canceled, and the dependency of Claim 24 was changed from Claim 23 to Claim 24.

Applicant respectfully submits that the foregoing arguments and the amendments to the Claims obviate the Examiner's objections and the objections to claims 5 and 6 should be reversed.

CLOSING

In summary, the Appellants have shown that their claimed invention is fully supported by a body of evidence showing that there was no basis for an objection to Claim 2, that their invention was not anticipated, and that there was no basis for the objection to Claims 5-7, 16 and 18-22. It is therefore respectfully submitted that evidence of no anticipation overcomes any showing of anticipation shown by the Examiner and that the proposed amendments place the application in a condition for allowance. The Appellants therefore submit that the final rejection of their Claims 1-4, 15, and 17 is improper and that the objection to Claims 5-7, 16 and 18-22 is improper under 35 USC §102(b)

The reversal of the final rejection is respectfully solicited from the Board

Respectfully submitted,

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CLAIM APPENDIX

1. In a vehicle having a powertrain and an anti-lock braking system (ABS), a method of controlling the ABS, comprising:

accumulating responses of the ABS to a series of sudden braking events;

correlating the ABS responses to one or more natural vibration frequencies of the vehicle; and,

selecting an ABS response to a brake request based on the correlated ABS responses in order to avoid exciting the powertrain at the one or more natural vibration frequencies.

2. The method of claim 1, wherein the correlating step includes determining which of the accumulated responses excite the powertrain at the one or more natural vibration frequencies.

3. The method of claim 2, wherein the accumulating step includes storing the ABS responses in a memory on-board the vehicle.

4. The method of claim 1, wherein the correlating step includes determining which of the accumulated ABS responses produces reactive torque in the powertrain at frequencies that are near the one or more natural vibration frequencies.

5. The method of Claim 1, wherein the selecting step includes selecting a nominal ABS response and altering the nominal ABS response by delaying the nominal ABS response for a selected period of time.

6. The method of Clam 1, wherein the selecting step includes selecting a nominal ABS response and altering the nominal ABS response by accelerating the nominal ABS response.

7. The method of claim 6, wherein the nominal ABS response comprises pulsing brakes on the vehicle and the altering step comprises altering the rate at which the brakes are pulsed.

8. A method of controlling an anti-lock braking system (ABS) to avoid exciting a natural vibration frequency of a vehicle, comprising:

determining the response of the ABS to a series of sudden braking events;

developing a set of vehicle natural natural frequencies that may be excited by the ABS using the response of the ABS to the series of braking events;

selecting an ABS response to a driving event requiring actuation of the ABS;

determining whether the selected ABS response may excite any of the frequencies in the developed set; and

altering the selected ABS response to avoid exciting any of the frequencies in the developed set.

9. The method of claim 8, wherein the developing step is performed by:

determining the natural vibration frequencies of the vehicle; and,

selecting the determined natural vibration frequencies that are excited by the ABS.

10. (Currently Amended) The method of claim 9, wherein the natural frequencies are selected by correlating the ABS responses with the determined natural frequencies

to thereby establish which of the natural vibration frequencies are excited by the ABS responses.

11. The method of claim 8, further comprising the step of storing the response of the ABS to the series of sudden braking events.

12. The method of claim 8, wherein the altering step includes delaying the execution of the selected ABS response.

13. The method of claim 8, wherein the altering step comprises accelerating the execution of the selected ABS response.

14. The method of claim 8, wherein the altering step comprises altering the rate at which the ABS pulses the brakes of the vehicle.

15. A system for controlling an anti-lock braking system (ABS) to avoid exciting a natural vibration frequency of a vehicle, comprising:

computer memory having a stored set of ABS responses to past sudden braking events requiring actuation of the vehicle's ABS; and,

a set of programmed instructions for comparing a proposed ABS response with the ABS responses stored in the memory and for altering the proposed response based on the comparison to avoid an ABS responsive that may excite a vehicle natural frequency

16. The system of claim 15, wherein the programmed instructions include instructions for accelerating the proposed ABS response.

17. The system of claim 15, including a data input device for transferring vehicle natural frequencies to the memory.

18. A method of controlling an anti-lock braking system (ABS) to avoid exciting a natural vibration frequency of a vehicle, comprising:

storing responses of the ABS to a series of past sudden braking events that resulted in exciting a vehicle natural frequency;

selecting a proposed ABS response to a driving event requiring actuation of the ABS; and,

altering the proposed ABS response based on the stored ABS responses.

19. The method of claim 18, wherein the ABS responses to the series of past braking events are stored in a memory on-board the vehicle.

20. The method of claim 18, wherein the storing step includes storing a plurality of combinations of brake pressures and braking pulsing frequencies.

21. The method of claim 20, including the step of correlating responses of the ABS to the series of past braking events with natural vehicle frequencies.

22. The method of claim 18, including the step of measuring the response of the ABS to the series of past braking events with natural vehicle frequencies.

23. The method of claim 22, wherein the measuring step includes measuring brake pressures and braking pulsing frequencies.

24. The method of claim 23, wherein altering the proposed ABS response includes increasing the brake pulsing frequency.

EVIDENCE APPENDIX

NONE

RELATED PROCEEDINGS APPENDIX

NONE